UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte MARK S. ANDREACO, CHARLES W. WILLIAMS,
RONALD NUTT, and MICHAEL E. CASEY

Appeal 2007-2302
Application 10/779,596
Technology Center 2800

Decided: November 27, 2007

Before JAMES D. THOMAS, JAY P. LUCAS, and
ST. JOHN COURTENAY III, *Administrative Patent Judges*.

COURTENAY, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134(a) from the Examiner's rejection of claims 1-50. We have jurisdiction under 35 U.S.C. § 6(b). We AFFIRM.

THE INVENTION

The disclosed invention generally relates to an apparatus capable of determining the energy, position and time coordinates of light emission induced by interactions of gamma-rays in a planar array of discrete scintillator detectors having either a segmented or non-segmented light guide. Appellants' invention finds particular application in the field of medical imaging whereby a single device can be used for Single Photon Imaging which includes traditional Gamma Cameras, Planar Imaging, and Single Photon Emission Computed Tomography (SPECT) with or without Coincidence Photon Imaging and Positron Emission Tomography (PET) (Spec. 1).

Independent claim 1 is illustrative:

1. A scintillation detector array for encoding energy, position and time coordinates of gamma ray interactions for use in Positron Emission Tomography imaging, said scintillation detector array comprising:

a plurality of discrete scintillator elements which interact with incident gamma-rays to produce a quantifiable number of scintillation photons, wherein each of said plurality of discrete scintillators is composed of a first layer having a first selected decay time and a second layer having a second selected decay time, wherein said first selected decay time is not equal to said second selected decay time, and further wherein said first layer is composed of a first selected scintillator material and said second layer is composed of a second selected scintillator material and wherein said first and second selected scintillator materials are stacked one upon

the other, whereby a pulse shape discrimination technique is used to determine which said layer the gamma ray interacts;

an optical detector associated with each of said plurality of discrete scintillator elements and positioned for sensing and quantifying said scintillation photons exiting each of said plurality of discrete scintillator elements;

a continuous light guide having first and second planar surfaces disposed between said plurality of discrete scintillator elements and said associated optical detectors for distributing scintillation photons exiting said plurality of discrete scintillators to said associated optical detectors; and

a means operatively associated with said scintillation detector array for determining time, energy, depth and transverse and longitudinal position coordinates of gamma ray interactions in said plurality of discrete scintillator elements.

THE REFERENCES

The Examiner relies upon the following references as evidence in support of the rejection:

Berninger	US 3,919,556	Nov. 11, 1975
Wong	US 5,319,204	Jun. 7, 1994
Roscoe	US 5,521,378	May 28, 1996
Engdahl	US 5,753,917	May 19, 1998
Skillicorn	US 6,060,713	May 9, 2000
Moisan	US 6,087,663	Jul. 11, 2000

THE REJECTIONS

1. Claims 1-5, 8-11, 14, 16-20, 22, 38, 46-48, and 50 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the teachings of Wong in view of Berninger, and further in view of Engdahl.
2. Claims 6, 7, 12, 13, 17[1], 23-35, 37, and 39-45 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the teachings of Wong in view of Berninger, and further in view of Engdahl, Skillicorn, and Roscoe.
3. Claims 15, 21 and 49 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the teachings of Wong in view of Berninger, and further in view of Engdahl and Moisan.
4. Claim 36 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over the teachings of Wong in view of Berninger, and further in view of Engdahl, Skillicorn, Roscoe, and Moisan.

Rather than repeat the arguments of Appellants or the Examiner, we make reference to the Brief and the Answer for the respective details thereof.

STATEMENT OF LAW

"What matters is the objective reach of the claim. If the claim extends to what is obvious, it is invalid under *§ 103*." *KSR Int'l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727, 1742 (2007). To be nonobvious, an improvement must be

[1] We note that independent claim 17 is rejected twice, in both the first and second stated rejections (Ans. 4, 6).

"more than the predictable use of prior art elements according to their established functions." *Id.* at 1740. Appellants have the burden on appeal to the Board to demonstrate error in the Examiner's position. *See In re Kahn*, 441 F.3d 977, 985-86 (Fed. Cir. 2006) ("On appeal to the Board, an applicant can overcome a rejection [under § 103] by showing insufficient evidence of *prima facie* obviousness or by rebutting the *prima facie* case with evidence of secondary indicia of nonobviousness.") (quoting *In re Rouffet*, 149 F.3d 1350, 1355 (Fed. Cir. 1998)). Therefore, we look to Appellants' Brief to show error in the proffered prima facie case.

Claims 1-5, 8-11, 14, 16-20, 22, 38, 46-48 and 50

We consider first the Examiner's rejection of claims 1-5, 8-11, 14, 16-20, 22, 38, 46-48, and 50 as being unpatentable over the teachings of Wong in view of Berninger further in view of Engdahl. Since Appellants' arguments with respect to this rejection have treated these claims as a single group which stand or fall together, we will select independent claim 1 as the representative claim for this rejection. *See* 37 C.F.R. § 41.37(c)(1)(vii)(2005).

Appellants present three principal arguments against the first stated rejection:

1) The Examiner's proffered combination, specifically Engdahl, "fails to disclose an assembly wherein each of the first and second layers of

scintillation crystals defines 'a plurality of discrete scintillator elements' as claimed in the present invention" (App. Br. 20).

2) There is no motivation "to modify Wong's PET camera so as to include a light pipe configured in the manner taught by Berninger" (Br. 13, 18), because "Wong does not utilize convexly curved photocathodes as taught by Berninger" (App. Br. 18).

3) There is no reasonable expectation of success in combining the teachings of Wong and Berninger, since the combination would leave a void "between the light pipe and the detectors" (App. Br. 19).

Regarding the first argument, the Examiner failed to directly respond to this argument, but points to Engdahl's scintillation crystal assembly 12 as teaching the disputed limitation (Ans. 5-6). At the outset, we find no limitation in independent claim 1 requiring *each of the first and second layers* of scintillation crystals to define "a plurality of discrete scintillator elements". To the contrary, we find that claim 1 requires "a plurality of discrete scintillator elements", wherein each of the discrete scintillators has a first layer and a second layer. Each layer having a plurality of elements differs from each element (i.e., scintillator element) having a plurality of layers. We note that patentability is based upon the claims. "It is the claims that measure the invention." *SRI Int'l v. Matsushita Elec. Corp. of America*, 775 F.2d 1107, 1121 (Fed. Cir. 1985) (*en banc*). Here, we agree with the Examiner, and find that Engdahl teaches the claimed crystal having first and

second layers (col. 3, ll. 13-14) with first and second decay times (col. 3, ll. 53-55).

Regarding Appellants' second argument that there is no motivation to modify Wong's PET camera to include a light pipe because Wong does not use convexly curved photocathodes, the Examiner disagrees and argues that the Berninger reference was relied upon only as a general teaching of using light guides between scintillator crystals and photodiodes generally, rather than suggesting incorporation of the particular light guide used by Berninger into Wong's camera (Ans. 8). We agree with the Examiner, and note that the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of a primary reference. It is also not that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. *In re Keller*, 642 F.2d 414, 425 (CCPA 1981); *In re Young*, 927 F.2d 588, 591 (Fed. Cir. 1991).

Here, we find the combined teaching of the references would have suggested using, not the particular light pipe used by Berninger, but a light pipe shaped in such a manner that it "conform[s] to the outer surfaces" of the claimed optical detectors, in order to provide a refractive index match between the scintillator elements and the optical detectors (Berninger, col. 7, ll. 21-32).

Additionally, with respect to the issue of motivation, we note the U.S. Supreme Court has recently stated:

> When a work is available in one field, design incentives and other market forces can prompt variations of it, either in the same field or in another. If a person of ordinary skill in the art can implement a predictable variation, and would see the benefit of doing so, §103 likely bars its patentability. Moreover, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond that person's skill. *KSR*, 127 S. Ct. at 1731.

This reasoning is applicable here. We note that Wong, Berninger and Engdahl are each directed to gamma cameras. Moreover, the Examiner has merely relied on Berninger for its general teaching of using light pipes between scintillator elements and phototubes (Answer 5, 8-9). We find that Berninger provides several reasons for using a light pipe between the scintillators and the phototubes (col. 7, ll. 4-32), such as providing "an optically transparent medium to supply the offset distance between the plane of the [phototubes] and the output face of the scintillator necessary for satisfactory camera linearity and position resolution" (col. 7, ll. 14-18), and "providing a refractive index match" between the scintillator elements and the optical detectors (col. 7, ll. 23-25). Therefore, we conclude that modifying Wong with the light pipe of Berninger and the dual layer crystal of Engdahl would have been a predictable variation of prior art elements

according to their established functions. We find common sense dictates that the modification proffered by the Examiner would have been well within the level of knowledge possessed by a person having ordinary skill in the art.

Regarding Appellants' third argument that there is no reasonable expectation of success in combining the teachings of Wong and Berninger, Appellants' argument rests on the premise that the combination of Wong and Berninger would leave a void "between the light pipe and the detectors" (App. Br. 19). As discussed above, the proper combination of Wong and Berninger would result in a light pipe shaped to conform to the surface of the optical detectors, which would not leave such a void. Therefore, we disagree with Appellants, and find that there would be a reasonable expectation of success in combining the respective teachings of Wong and Berninger.

In addition to the above arguments, Appellants further contend the Examiner's rejections are "omnibus rejections" that fail to establish a prima facie case of obviousness (App. Br. 22). While the Examiner has not cited specific column and line numbers in the rejections, we find the Examiner has identified specific element numbers (or element names) from the prior art references that correspond to the claimed structural elements. Appellants further argue that the Examiner has not addressed each claim individually (App. Br. 23). However, we note that Appellants have failed to present any substantive arguments directed to the separate patentability of any dependent

claims. Arguments which Appellants could have made but chose not to make in the Brief have not been considered and are deemed to be waived. *See* 37 C.F.R. § 41.37(c)(1)(vii)(2005). *See also In re Watts*, 354 F.3d 1362, 1368 (Fed. Cir. 2004). *See In re Young,* 927 F.2d 588, 590 (Fed. Cir. 1991).

For at least the aforementioned reasons, we conclude the weight of the evidence supports the Examiner's position. Thus, we find Appellants have failed to persuasively rebut the Examiner's legal conclusion of obviousness by establishing insufficient evidence of *prima facie* obviousness or evidence of secondary indicia of nonobviousness. Accordingly, we sustain the Examiner's rejection independent claim 1 as being unpatentable over Wong in view of Berninger further in view of Engdahl.

Pursuant to 37 C.F.R. § 41.37(c)(1)(vii), we have decided the appeal with respect to the remaining claims in this group on the basis of the selected claim alone. Therefore, we will sustain the Examiner's rejection of independent claims 2-5, 8-11, 14, 16-20, 22, 38, 46-48, and 50 as being unpatentable over Wong in view of Berninger and Engdahl for the same reasons discussed *supra* with respect to representative claim 1.

Claims 6, 7, 12, 13, 17, 23-35, 37, and 39-45

Appellants argue that "the same arguments" as those discussed above apply to the additional combination of Skillicorn and Roscoe for the second stated rejection of claims 6, 7, 12, 13, 17, 23-35, 37, and 39-45 (App. Br.

24). In response, we see no deficiencies with respect to the first stated rejection, as discussed above.

Moreover, after carefully considering the record before us, we conclude the Examiner's proffered combination of Wong, Berninger, Engdahl, Skillicorn, and Roscoe reasonably teaches and/or suggests Appellants' claimed invention in terms of *familiar elements* (e.g., various implementations of gamma cameras, x-ray detectors, and scintillator elements) that would have been combined by an artisan having ordinary skill and common sense using *known methods* to achieve a *predictable result* at the time of the invention. *See KSR*, 127 S. Ct. at 1739-40. "The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." *Leapfrog Enter., Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157, 1161 (Fed. Cir. 2007) (quoting *KSR*, 127 S. Ct. at 1739). Appellants have not shown that the claimed combination of familiar elements produces a new function. In addition, Appellants have not provided any factual evidence of secondary considerations such as unexpected or unpredictable results, commercial success, long felt but unmet need, etc.

For at least the aforementioned reasons, we conclude the Examiner has articulated an adequate reasoning with a rational underpinning that reasonably supports the proffered combinability of the references cited by the Examiner.[2] Therefore, we sustain the Examiner's rejection of these

[2] "[T]he examiner bears the initial burden, on review of the prior art or on any other ground, of presenting a *prima facie* case of unpatentability." *In re*

claims as being unpatentable over Wong in view of Berninger, Engdahl, Skillicorn, and Roscoe for the reasons discussed immediately above and also for same reasons discussed above with respect to representative claim 1.

Claims 15, 21, 36, and 49

Appellants again argue that "the same arguments" as those discussed above apply to the additional combination of Moisan for the third and fourth stated rejection of claims 15, 21, 36, and 49 (App. Br. 27). We see no deficiencies with respect to the first stated rejection, as discussed above.

Appellants further argue the Examiner has not shown any teaching, suggestion, or motivation to modify Wong's device to include the various elements of Berninger, Engdahl, Skillicorn, Roscoe, or Moisan (*Id.*).

In view of the Supreme Court's recent opinion in *KSR Int'l Co. v. Teleflex Inc.*, our analysis here does not turn upon whether the Examiner has provide an adequate teaching, suggestion, or motivation to combine the references. Instead, we view the question before us to be whether sufficient difference exists between the prior art and Appellants' claims to render the claims nonobvious. In *KSR*, the Supreme Court reaffirmed that "[w]hen a

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Oetiker, 977 F.2d 1443, 1445 (Fed. Cir. 1992). Moreover, "'there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness' . . . [H]owever, the analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." *KSR*, 127 S. Ct. at 1741 (quoting *In re Kahn*, 441 F.3d at 988).

patent 'simply arranges old elements with each performing the same function it had been known to perform' and yields no more than one would expect from such an arrangement, the combination is obvious." *KSR*, 127 S. Ct. at 1740 (quoting *Sakraida v. Ag Pro, Inc.*, 425 U.S. 273, 282 (1976)). Moreover, "[w]hen there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product . . . of ordinary skill and common sense." *KSR*, 127 S. Ct. at 1742.

Here, we again conclude that the Examiner's proffered combination of prior art reasonably teaches and/or suggests Appellants' claimed invention in terms of *familiar elements* (e.g., various implementations of gamma cameras, x-ray detectors, and scintillator elements) that would have been combined by an artisan having ordinary skill and common sense using *known methods* to achieve a *predictable result* at the time of the invention. *See KSR*, 127 S. Ct. at 1739-40. Appellants have not shown that the claimed combination of familiar elements produces a new function. Moreover, Appellants have not provided any factual evidence of secondary considerations such as unexpected or unpredictable results, commercial success, long felt but unmet need, etc. Therefore, we sustain the Examiner's rejection of claims 15, 21, and 49 as being unpatentable over Wong in view of Berninger, Engdahl, and Moisan. For the same reasons, we sustain the

Examiner's rejection of claim 36 as being unpatentable over Wong in view of Berninger, Engdahl, Skillicorn, Roscoe, and Moisan.

OTHER ISSUES

In the event that prosecution is reopened in this application, we note that claims 8 and 29 do not comply with the requirements of 35 U.S.C. § 112, fourth paragraph, since these claims fail to specify a further limitation of the subject matter claimed. *See also* 37 C.F.R. § 1.75(c).[3] The limitations set forth in claim 8 already appear in claim 1, from which claim 8 depends. Similarly, the limitations set forth in claim 29 already appear in claim 23, from which claim 29 depends.

Additionally, we note that claims 17 and 38 appear to violate 37 C.F.R. § 1.75(b), since they are substantially identical to claims 2 and 5, respectively. Substantially identical claims are inherently unduly multiplied and in violation of 37 C.F.R. § 1.75(b). [4]

DECISION

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[3] *See* 37 C.F.R. § 1.75(c): "One or more claims may be presented in dependent form, referring back to and further limiting another claim or claims in the same application."

[4] *See* 37 C.F.R. § 1.75(b): "More than one claim may be presented provided they differ substantially from each other and are not unduly multiplied."

Based on the findings of facts and analysis above, we conclude that the Examiner did not err in rejecting claims 1-50 under 35 U.S.C. § 103(a) for obviousness. Therefore, the decision of the Examiner rejecting claims 1-50 is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

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